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SIMATIC

ET 200eco Distributed I/O Station

Manual

This manual has the order number **6ES7198-8GA00-8BA0**

Edition 02/2003 A5E00158716-02 This manual contains notices intended to ensure personal safety, as well as to protect the products and connected equipment against damage. These notices are highlighted by the symbols shown below and graded according to severity by the following texts:



Danger

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indicates that minor personal injury can result if proper precautions are not taken.

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We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full

cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

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A5E00158716-02



Preface

Purpose of this manual

The information in this manual helps you to operate the ET 200eco distributed I/O station as DP slave on PROFIBUS DP.

Basic knowledge required

To understand the manual, you require general experience in the field of automation engineering.

This manual edition contains a description of the components valid at the time of its release. We reserve the right to append a Product Information that contains up–to–date information on new components or components of a new version.

Range of validity of this manual

This manual is valid for the ET 200eco distributed I/O station.

Changes as compared to the previous version

This manual contains the following changes and additions as compared to the previous manual:

- I/O module 16 DO 0.5 A (6ES7 142-3BH00-0XA0)
- I/O module 8 DI / 8 DO 1.3 A (6ES7 143-3BH00-0XA0)

Note: You tell the previous version of the ET 200eco manual by the number indicated in the footer: A5E00158716-01.

The number of this manual is: A5E00158716-02.

CE label

The product series SIMATIC S7- ET 200eco distributed I/O station is compliant with requirements and protective aims of following EU guidelines.

- EU guideline 73/23/EEC "Low-voltage guidelines"
- EU guideline 89/336/EEC "EMC compatibility"

C-Tick-Mark

The product series SIMATIC S7- ET 200eco distributed I/O station is compliant with the standard AS/NZS 2064 (Australia and New Zealand).

Standards

The product series SIMATIC S7 ET 200eco distributed I/O station is compliant with requirements and criteria of IEC 61131–2.

The ET 200eco distributed I/O station is based on the IEC 61784-1:2002 Ed1 CP 3/1 standard.

Its place in information technology

In addition to this documentation, you require the corresponding manual for your DP master.

Manual

This manual describes the hardware of your ET 200eco distributed I/O station. It consists of introductory chapters and reference chapters (technical specifications).

The manual deals with the following topics:

- Installation and wiring of the ET 200eco distributed I/O station
- Commissioning and diagnostics of the ET 200eco distributed I/O station
- Components of the ET 200eco distributed I/O station
- Order Numbers
- The glossary contains explanations of important terms.
- The index helps you to quickly find textual information on important keywords.

Recycling and disposal

ET 200eco equipment can be recycled due to the low content of harmful substances in its components.

Please contact a company certified for disposal of electronic waste material for environment friendly recycling and disposal of your old equipment.

Further support

Please contact your local SIEMENS partner if you have any further queries on the products described in this manual.

http://www.ad.siemens.de/partner

Training Centers

We offer a range of courses to help you get started with the ET 200eco distributed I/O station and the SIMATIC S7 PLCs. Please contact your local training center or the central training center in D 90327 Nuremberg.

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- your appropriate documentation via our Service & Support search engine
- a forum for the exchange of information between users and specialists worldwide
- your local Automation & Drives partner via our partner database.
- information on repairs, replacement parts and on-site service. Please refer to our "Service" pages for further topics.

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1

Product overview

In this chapter

This product information shows you

- the place of the ET 200eco distributed I/O station in the ET 200 distributed I/O station and
- the components comprising the ET 200eco distributed I/O station.

Chapter overview

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1.2	What is the ET 200eco distributed I/O system?	1-4

1.1 What are distributed I/O stations?

Distributed I/O systems – Field of application

Many systems are configured with a centralized process I/O system in the local PLC.

Greater distances between remote I/O and the PLC can result in badly arranged and extensive wiring. Also, electromagnetic interference may reduce reliability.

Plants of this type are suitable for operation with distributed I/O systems:

- local controlling CPU
- distributed I/O systems (inputs and outputs) operate at remote locations
- the high–performance PROFIBUS-DP provides high data transmission rates for trouble–free communication between the controlling CPU and the I/O systems.

What is **PROFIBUS-DP**?

PROFIBUS-DP is an open bus system according to the IEC 61784-1:2002 Ed1CP 3/1 standard with a "DP" transfer protocol (DP stands for distributed periphery, or distributed I/O).

PROFIBUS-DP is physically an electrical network that is based on shielded twisted pair cables or optical waveguide networking.

The "DP" protocol allows fast, cyclic data exchange between the controlling CPU and distributed I/O systems.

What are DP masters and DP slaves?

The DP master forms the interface between the controlling CPU and the distributed I/O system. The DP master exchanges data with distributed I/O systems via PROFIBUS-DP and monitors the PROFIBUS DP.

Distributed I/O systems (= DP slaves) prepare sensors and actuator data locally for their transfer to the PLC via PROFIBUS DP.

Which devices can I connect to PROFIBUS-DP?

A wide range of devices can be connected on the PROFIBUS-DP as DP masters or DP slaves, provided that they operate in accordance with IEC 61784-1:2002 Ed1 CP 3/1. Among others, devices from the following product families can be used:

- SIMATIC S5
- SIMATIC S7/M7/C7
- SIMATIC programming devices/PCs
- SIMATIC HMI (operator control and monitoring stations OP, OS, TD)
- Devices from other vendors

Structure of a PROFIBUS-DP network

The figure below shows you a typical PROFIBUS DP network structure. The DP masters are integrated in the corresponding unit, e.g. the S7-400 or S7-300 is equipped with a PROFIBUS-DP interface. The DP slaves, namely the distributed I/O, are interconnected to the DP masters via PROFIBUS DP.



Figure 1-1 Typical structure of a PROFIBUS-DP network

1.2 What is the ET 200eco distributed I/O station?

Definition

The ET 200eco distributed I/O station is a compact DP slave (degree of protection IP 65, IP 66 or IP 67).

Field of application

- Due to its rugged design and degree of protection IP 65, IP 66 or IP 67, the ET 200eco distributed I/O station is primarily suitable for operation under harsh industrial conditions.
- The compact design of ET 200eco allows its use in confined areas and
- its easy handling features ensure efficient commissioning and maintenance.

View

The ET 200eco consists of an I/O module and a terminal block. These components are available in different versions.



Figure 1-2 View of the ET 200eco distributed I/O station

ET200eco components

The table provides an overview of the major components of ET 200eco:

Table 1-1	FT	200eco	com	ponents
	<u> </u>	2000000	00111	pononio

Component	Function	Figure
I/O module	You connect sensors and actuators to the I/O module. The I/O module is available in the following versions: • 8 DI • 16 DI • 8 DO 2A • 16 DO 0.5 A • 8 DI / 8 DO 2A • 8 DI / 8 DO 2A • 8 DI / 8 DO 1.3 A	
Terminal block	You connect the ET 200eco power supply and the PROFIBUS-DP cable to the terminal block. The terminal block is available in the following versions: • ECOFAST • M12, 7/8"	

DP master

The ET 200eco station can communicate with all DP masters that operate according to IEC 61784-1:2002 Ed1 CP 3/1.

Installation

Easy installation

The design of the ET 200eco distributed I/O station allows easy installation.

Chapter overview

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2.6	Setting the PROFIBUS address	2-6

2.1 Mounting position/dimensions

Mounting position

The ET 200eco can be mounted in any position

Mounting and spacing dimensions

T 1 1 0 1	
Table 2-1	Mounting dimensions

Dimensions	
Mounting width	60 mm
Mounting height	210 mm
Mounting depth	 with terminal block ECOFAST: 60 mm (without plug) with terminal block M12, 7/8": 54 mm (without plug)

2.2 I/O module installation

Properties

- The I/O module must be mounted onto a solid base.
- The I/O module (without terminal block) can be prewired.

Requirements

Screws:

Screw type	Explanation
M5 cylindrical head screw to ISO 1207/ISO 1580 (DIN 84/DIN 85)	Minimum screw length: 20 mm. Additionally required: DIN 125 washers.
Cylindrical head screw with M5 hexagonal socket to DIN 912	

Tools required

Medium size Pillipps screwdriver or 8 mm socket wrench

Procedure

Using the screws, tighten the I/O module onto a level base. The I/O module must be screwed onto the base at both fastening points (at the front panel top and bottom). Tightening torque: 3 N/m.



Figure 2-1 Mounting the I/O module onto the base

2.3 Installation of the terminal block

Properties

The terminal block connects the ET 200eco to the power supply and to the PROFIBUS DP network.

Requirements

The I/O module is installed.

Tools required

Medium size Phillips screwdriver

Installation of the terminal block

- 1. Insert the terminal block into the I/O module.
- 2. Bolt the terminal block to the I/O module (with a torque of 1 to 1.3 nm). Tighten the screws evenly in diagonally opposite sequence.
 - The terminal block is equipped with four captive screws (see Figure 2-2).



Figure 2-2 Inserting and screw-tightening the terminal block at the I/O module

Note

The protection type IP 65, IP 66 or IP 67 is only ensured after the terminal block is screwed tight onto the I/O module!

2.4 Label replacement

Properties

You can use these labels to identify each of the I/O module's channels and the terminal block. The system is supplied with snap–on labels:

- 8 labels on the I/O module
- 1 label on the terminal block

Requirements

Replacement labels are available on order. For order numbers please refer to Appendix A.

Tools required

Screwdriver, 2.5 mm to 4 mm blade

Label replacement

1. Insert the screwdriver into the small opening on the label and lever it out.



Figure 2-3 Removing labels

2. Snap the new label tag into the holder on the module.

2.5 Removing ET 200eco

Procedure

The ET 200eco is wired and in operation.

- 1. Switch off the ET 200eco power supply.
- 2. Disconnect the terminal block wiring.
- 3. Unscrew the terminal block and remove it from the I/O module.
- 4. Disconnect the wiring on the I/O module.
- 5. Unscrew the I/O module.

Note

Please note Chapter 3.4.5 before you replace the I/O module.

2.6 PROFIBUS address assignment

Properties

Specify the PROFIBUS address under which the ET 200eco I/O station is accessed on PROFIBUS DP.

Requirements

- The PROFIBUS-DP address for ET 200eco is set at the terminal block.
- All PROFIBUS-DP addresses must be unique.
- The set PROFIBUS address must match the PROFIBUS address specified in your configuration software (for this ET 200eco).
- A change of PROFIBUS–DP address is only valid after the ET 200eco has been powered up (power ON).

Tools required

- 14 mm socket wrench
- Screwdriver with 2.5 mm blade

How to set the PROFIBUS-DP address at the terminal block M12, 7/8"

The permitted PROFIBUS-DP address range is 1 to 99.

- 1. Remove both lock caps on the rotary selector switches (use the 14–mm socket wrench if need be).
- 2. Using the screwdriver, set the required PROFIBUS address on the selector switches.
 - Lower selector switch: one's place
 - Upper selector switch: ten's place
- 3. Screw the two caps onto the selector switches again (Torque : 0.5 to 0.8 N/m).



Figure 2-4 How to set the PROFIBUS-DP address at terminal block M12, 7/8"

How to set the PROFIBUS-DP address at the ECOFAST terminal block

Valid range of the PROFIBUS DP addresses: 1 to 99. If you select a higher address, the I/O module will return an error signal via the red bus error LED.

1. Unscrew and remove the configuration module from the ECOFAST terminal block.



Figure 2-5 How to unscrew the configuration module

- 2. Unscrew and remove the cap of the configuration module.
- 3. Set the PROFIBUS address on the DIL switches.



Figure 2-6 How to set the PROFIBUS address at the configuration module

4. Screw on the cap again. Reinsert the configuration module and fasten it on the terminal block with the screws.

Wiring

Introduction

Special rules and regulations apply to the integration of ET 200eco distributed I/O stations in plants and systems.

This chapter provides an overview of the essential rules for the integration of ET 200eco distributed I/O stations in plants or systems.

Chapter overview

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3.2	ET 200eco must be operated on a grounded power supply	3-2
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3.4	Wiring ET 200eco	3-7

3.1 General rules and regulations for the operation of ET 200eco

EMERGENCY-OFF devices

All EMERGENCY–OFF devices according to IEC 204 (corresponds to DIN VDE 113) must be enabled for all plant or system operating states.

Plant startup after specific events

The table below shows what you need to observe for a restart of the plant after specific events.

lf	then
Startup after voltage drop or loss Startup of ET 200eco after an interrupt of bus communication	hazardous states must not develop. If necessary, force EMERGENCY–OFF!
Startup after release of the "EMERGENCY–OFF" device	controlled and defined startup must be ensured at all times.

24 VDC power supply

The table below shows what you have to observe when operating the 24 VDC power supply.

For	always provide		
buildings	an external lightning protection	lightning protection measures (e.g. lightning protection	
24 VDC supply lines, signal lines	internal lightning protection	elements)	
24 VDC supply	safe (electrical) isolation of the extra-low voltage		
Power supply routing	Power loss in the through–loop (see Chapter 3.4.5).		

Protection against external electrical interference

The table below shows what you have to observe in order to protect your system from electrical interference and faults.

For	ensure that
all plants or systems equipped with an ET 200eco,	the plant or system is connected to a grounding conductor in order to discharge electromagnetic interference.
power supply/signal/bus cables	correct installation and cable routing.
signal and bus cables	a cable/wire break can not cause indefinite plant or system states.

3.2 ET 200eco operation on a grounded power supply

Below you can find information on the overall structure of an ET 200eco distributed I/O station that is operated on a grounded power supply (TN-S network). The topics treated here are: shutdown devices, short–circuit/overload protection to DIN VDE 0100 and DIN EN 60204-1.

Definition: Grounded powersupply

The neutral conductor of grounded power supplies is connected to ground. Any ground fault at a live conductor or grounded part of the system will trigger a response of the protection devices.

Components and protective measures

Vario1us components and protective devices are mandatory for plant/system installation. The type of components and the binding character of the regulations for protective measures depends on the DIN VDE regulation that applies to your plant installation. The table below refers to Figure 3-1.

Compare	Refe- rence to Figure 3-1	DIN VDE 0100	DIN EN 60204
Shutdown device for the controller, signal transducers and actuators	1	Part 460: Main switch	Part 1: Isolating switches
Short–circuit and over- load protection	2	Part 725: Single–pole fu- sing of circuits	Part 1: grounded secondary circuit: single-pole fusing

Safety electrical isolation

Safety electrical isolation is required for :

- Modules that require a \leq 60 VDC or \leq 25 VAC power supply
- 24 VDC load current circuit

ET 200eco installation with grounded reference potential

In ET 200eco installations with grounded reference potential all electrical interference is discharged to protective earth. These connections must be interconnected externally or in the connector (see Figure 3-1: Interconnecting 1M and PE).

ET 200eco installation with floating reference potential

In ET 200eco installations with floating reference potential any electrical interference is discharged to protective earth via an internal RC network (see Figure 3-1: **No** interconnection 1M to PE).

Isolation monitoring

The following situations always require isolation monitoring:

- ungrounded ET 200eco installations
- if hazardous plant states can develop due to successive faults

Overall structure of ET 200eco

Figure 3-1 shows the overall structure of an ET 200eco distributed I/O station ((Load supply voltages and grounding concept) with power supply from a TN-S network.



Figure 3-1 ET 200eco operation with reference potential bonded to equipotential earth

3.3 Electrical structure of the ET 200eco system

Isolated potential

The electrical circuit of an ET 200eco is galvanically separated between:

- 1L+ (electronic circuit/sensor supply): Potential isolation to PROFIBUS-DP and 2L+ (load voltage supply),except I/O module 8 DI/8 DO 2 A.
- 2L+ (load voltage supply): Potential isolation to all other circuit elements execpt I/O module 8 DI/8 DO 2 A. For I/O module 8 DI/8 DO 2 A, 1M and 2M are interconnected internally.
- PROFIBUS-DP interface:
 Potential isolation to other circuit components.

ET 200eco structure

The figures below show the potentials in an ET 200eco installation with M12, 7/8" terminal block.



Figure 3-2 Potentials in an ET 200eco installation with M12, 7/8" terminal block



Figure 3-3 Potentials in an ET 200eco installation with ECOFAST terminal block

Note

* For operation of the ET 200eco distributed I/O station with an I/O module 8 DI / 8 DO 2 A, the ground potentials of the electronic/sensor supply (1L+) and load voltage supply (2L+) are interconnected.

Note

The following applies to an ET 200eco with terminal block:

- The electronic/sensor power supply 1L+ powers the sensors.
- The outputs are powered via by the load voltage supply 2L+.

Protecting components from damage

In order to avoid the destruction of ET200eco components, you must always provide external line fusing for the electronic/sensor power supply and load voltage:

- Fusing of the electronic/sensor power supply (1L+): DC 24 V / 10 A: Tripping characteristics (type) B or C
- Fusing of the load voltage supply: (2L+) 24 VDC / 16 A: Tripping characteristics (type) B or C

3.4 Wiring ET 200eco

In this chapter,	you will find	on page
3.4.1	How to connect ET 200eco to protective earth (PE)	3-8
3.4.2	How to wire I/O modules	3-9
3.4.3	How to wire the ECOFAST terminal block	3-19
3.4.4	How to wire the M12, 7/8" terminal block	3-23
3.4.5	How to loop the PROFIBUS DP and the supply voltage	3-27

Wiring procedure

The ET 200eco distributed I/O station is wired in several steps. We recommend you take the following procedure:

- 1. Connect ET 200eco to protective earth. See Chapter 3.4.1
- 2. Wire the I/O module. See Chapter 3.4.2
- 3. Wiring the terminal block. See Chapter 3.4.3, 3.4.4 or 3.4.5

3.4.1 How to connect ET 200eco to protective earth (PE)

Properties

- You must always connect the ET 200eco to protective earth. The I/O module is equipped with a grounding bolt for this purpose.
- The connection to protective earth is also required for the discharge of electrical interference to ground and for EMC compatibility.

Requirements

Always provide a low-impedance connection to protective earth.

Tools required

- Wire stripper
- Crimp tool
- Screwdriver

Accessories required

- M5 x 10 fastening bolt and washers
- Grounding conductor (copper braid cable), minimum conductor cross-section 4 mm².
- Cable lug

How to connect ET 200eco to protective earth

- 1. Strip the grounding cable and crimp on the cable lug.
- Screw the cable lug onto the M5 bolt of the I/O module. Tightening torque: 3 N/m.



Figure 3-4 Connecting the I/O module to protective earth

3.4.2 How to wire I/O modules

Properties

- Connect the digital inputs/outputs to the round 5–pin M12 sockets on the front panel of the I/O module.
- Here you can also use 5–pin M12 coupler plugs or Y connectors. Order numbers are found in Appendix A.

Requirements

Switch off the power supply or disconnect the terminal block before you wire the I/O modules.

Tools required

Wire stripper and screwdriver for wiring the M12 coupler plug, if you do not use prefabricated cables.

Accessories required

- prefabricated cable with 5-pin M12 coupler plug
- or 3-, 4- or 5-conductor flexible copper cable (conductor cross-section must be: $\leq 0.75 \text{ mm}^{2}$ and a 5–pin M12 coupler plug (see Tables 3-1, 3-2, 3-3 and 3-6).
- M12 caps
- For order numbers please refer to Appendix A. ٠

Pin assignment

The tables below show you the pin assignment of the I/O modules.

• I/O module 8 DI

Table 3-1	Pin assignment of the M12 coupler plug for the I/O module 8 DI
-----------	--

Pin	Assignment X1 to X8	View of the coupler plug (wiring side)
1	24V sensor power supply (1L+)*	3- 4 - or 5-pole cop-
2	n.c.	
3	Ground potential, sensor power supply (1M)	
4	Input signal	
5	PE	

- sensor power supply via ET 200eco
- I/O module 16 DI

Table 3-2	Pin assignment of the M12	2 coupler plug for the I/O module 16	DI

Pin	Assignment X1 to X8	View of the coupler plug (wiring side)
1	24V sensor power supply (1L+)*	4- or 5-pole copper cable
2	Input signal** (n+8)	
3	Ground potential, sensor power supply (1M)	
4	Input signal*** (n)	
5	PE	

sensor power supply via ET 200eco *

** In the process input image (PII): input byte x+1 (see Figure C-2)
 *** In the process input image (PII): input byte x (see Figure C-2)
• I/O module 8 DO 2 A

Pin	Assignment X1 to X8	View of the coupler plug (wiring side)
1	n.c.	
2	n.c.	3 - or
3	Ground potential, load voltage supply (2M)	
4	Output signal	
5	PE	

Table 3-3 Pin Assignment for M12 Coupler Plug for I/O Module 8 DO 2 A

• I/O module 16 DO 0.5 A

Table 3-4	Pin assignment	of M12 coupler	plua for I/C	module 16	DO 0.5 A

Pin	Assignment X1 to X8	View of the coupler plug (wiring side)
1	n.c.	4- or 5-pole copper cable
2	Output signal* (n+8)	
3	Ground potential, load voltage supply (2M)	
4	Output signal** (n)	
5	PE	

* In the process output image (POI): output byte x+1 (see Figure C-4) ** In the process output image (POI): output byte x (see Figure C-4)

• I/O module 8 DI / 8 DO 2 A

Pin	Assignment	View of the coupler plug (wiring side)
1	24V sensor power supply (1L+)*	4- or 5-pole copper cable
2	Input signal	
3	Ground potential, sensor/load voltage supply (1M / 2M)**	
4	Output signal	
5	PE	

Pin assignment of M12 coupler plug for I/O module 8 DI / 8 DO 2 A $\,$ Table 3-5

* sensor power supply via ET 200eco
 ** common ground potential for sensor/load voltage supply (1M and 2M internally interconnected)

• I/O module 8 DI / 8 DO 1.3 A

Table 3-6	Pin assignment of M12 coupler plug for I/O module
	8 DI / 8 DO 1.3 A

Pin	Assignment X1, X3, X5, X7	View of the coupler plug (wiring side)
1	24V sensor power supply (1L+)*	4- or 5–pole copper cable
2	Input signal** (n+1)	
3	Ground potential, sensor power supply (1M)	
4	Input signal** (n)	
5	PE	

Pin	Assignment X2, X4, X6, X8	View of the coupler plug (wiring side)
1	n.c.	4- or 5-pole copper cable
2	Output signal*** (n+1)	
3	Ground potential, load voltage supply (2M)	$ \begin{array}{c c} \circ & \circ & 2 \\ \circ & \circ & \circ & \circ \\ \circ & \circ & \circ & \circ & \circ \\ \circ & \circ & \circ & \circ & \circ & \circ & \circ \\ \circ & \circ & \circ & \circ & \circ & \circ & \circ \\ \circ & \circ \\ \circ & \circ \\ \circ & \circ &$
4	Output signal*** (n)	
5	PE	

* sensor power supply via ET 200eco
** In the process input image (PII): input byte x (see Figure C-6)
*** In the process output image (POI): output byte x (see Figure C-6)

How to connect the M12 plug

- 1. Insert the plug into the corresponding round socket on the I/O module. Ensure that the plug and socket interlock (slot and groove).
- 2. Tighten the knurled screw of the plug.



Figure 3-5 How to connect the M12 plug

How to connect the Y connector

The Y connector can be used to connect two actuators or sensors to the inputs/outputs of the ET 200eco.

We recommend the use of this Y connector for configurations in which two channels are assigned per module socket:

- I/O module 16 DI
- I/O module 16 DO 0.5 A
- I/O module 8 DI / 8 DO 2 A
- I/O module 8 DI / 8 DO 1.3 A

The Y connector distributes the two channels to two coupler plugs (pin assignment, see Tables 3-7 and 3-10).

Note: You can not combine the Y connector with the angled M12 coupler plug, 5–pin, order no. 3RX1 668.

- 1. Insert the Y connector into the corresponding round socket on the I/O module. Ensure that the plug and socket interlock (slot and groove).
- 2. Tighten the knurled screw of the plug.



Figure 3-6 Y connector

Pin assignment for the Y connector of I/O module 16 DI

Pin	Assignment for coupler plug X1 to X8		Layout
	A (top)	B (lower)	Y connector
1	24V sensor power supply (1L+)*		A (top)
2	n.c.		
3	Ground potential, sensor power supply (1M)		3- or 4-conductor copper cable
4	Input signal at Pin 4**	Input signal at Pin 2**	
5	PE		(bottom)

Table 3-7 The Y connector and I/O module 16 DI

*

sensor power supply via ET 200eco the pins specified refer to the connecting socket on the I/O module **

Pin assignment for the Y connector of I/O module 16 DO 0.5 A

Table 3-8 Y connector for I/O module 16 DO 0.5 A

Pin	Assignment for coupler plug X1 to X8		Layout	
	A (top)	B (lower)	Y connector	
1	n.c.		A (top)	
2	n.c.			
3	Ground potential, load voltage supply (2M)		3- or 4-conductor copper cable	
4	Output signal from pin 4*	Output signal from pin 2*		
5	PE		(bottom)	

* The pins specified refer to the connecting socket on the I/O module.

Pin assignment for the Y connector of I/O module 8 DI / 8 DO 2 A

Pin	Assignment for coupler plug X1 to X8		Layout	
	A (top)	B (lower)	Y connector	
1	24V sensor power supply (1L+)*		A (top)	
2	n.c.			
3	Ground potential, sen supply (1M / 2M)***	sor/load voltage	3- or 4-conductor copper cable	
4	Output signal at pin 4**	Output signal at pin 2**	B 4	
5	PE	·	(bottom)	

Table 3-9 Y connector plug for I/O module 8 DI / 8 DO 2 A

sensor power supply via ET 200eco *

*** the pins specified refer to the connecting socket on the I/O module
 *** common ground potential for sensor/load voltage supply (1M and 2M internally interconnected)

Pin assignment for the Y connector of I/O module 8 DI / 8 DO 1.3 A

Pin	Assignment of coupler plug X1, X3, X5, X7		Layout
	A (top)	B (lower)	Y connector
1	24V sensor power supply (1L+)*		A (top)
2	n.c.		
3	Ground potential, sen: (1M)	sor power supply	3- or 4-conductor copper cable
4	Input signal at Pin 4**	Input signal at Pin 2**	B 4
5	PE		(bottom)

Table 3-10 Y connector plug for I/O module 8 DI / 8 DO 1.3 A

Pin	Assignment of coupler plug X2, X4, X6, X8		Layout
	A (top)	B (lower)	Y connector
1	n.c.		A (top)
2	n.c.		
3	Ground potential, load voltage supply (2M)		3- or 4-conductor copper cable
4	Output signal from pin 4**	Output signal from pin 2**	
5	PE		B (bottom)

* sensor power supply via ET 200eco

** the pins specified refer to the connecting socket on the I/O module

Cover all spare round sockets

Close all those sockets with M12 caps, in order to achieve protection class IP 65, IP 66 or IP 67. For order numbers please refer to Appendix A.

3.4.3 How to wire the ECOFAST terminal block

Properties

- Connect the supply voltages and PROFIBUS DP to the ECOFAST terminal block via ECOFAST connector.
- You can loop the supply voltages and PROFIBUS DP through an additional ECOFAST connector.
- Always terminate the first and the last ET 200eco (node) on the PROFIBUS-DP with a terminating resistor.

Requirements

You have set the PROFIBUS address (according to your project configuration).

Tools required

Screwdriver, wire stripper and crimp tool for wiring the ECOFAST connector – if you are not using a ready–made ECOFAST connector.

Accessories required

- ECOFAST hybrid prefabricated cable with ECOFAST plug. The cable is available in various lengths.
- If you do not use an ECOFAST hybrid prefabricated cable (see Table 3-11):
 - Han Brid Cu plug or Han Brid Cu terminal box
 - ECOFAST hybrid cable
- Terminating resistor (ECOFAST) for PROFIBUS DP
- For order numbers please refer to Appendix A.

How to wire the ECOFAST connector

Table 3-11 shows you the pin assignment of the ECOFAST connector

Table 3-11 Pin assignment of the ECOFAST connector

Pin	Assignment	View of the ECOFAST connector (terminal side for incoming signals and loop-through)
Α	PROFIBUS DP Signal A	Signal A
В	PROFIBUS DP Signal B	* A B Signal B
1	Electronic/sensor power supply (1L+)	ECOFAST hybrid cable
2	Ground potential, sensor power supply (1M)	
3	Ground potential, load voltage supply (2M)	1L+
4	Load voltage supply (2L+)	Ŭ

* Installation instructions are supplied with the Han Brid Cu plug or Han Brid Cu terminal box package.

How to connect the ECOFAST connector

- 1. Push down the interlocking mechanism for the ECOFAST connector.
- 2. Insert the ECOFAST connectors (for 1L+, 2L+ and PROFIBUS DP) into the sockets of the terminal block. Note the mechanical encoding of the connectors for incoming signals and loop–through.
- 3. Close the interlock of the ECOFAST connector.



Figure 3-7 Connecting the ECOFAST connector

Caution

It is not permitted to disconnect the ECOFAST connector during ET 200eco runtime! Always switch off the load voltage supply (2L+) before you disconnect the ECOFAST plug.

How to install the PROFIBUS DP terminating resistor

The first and the last node of a PROFIBUS DP segment must be terminated with a wave impedance.

At the last bus node, plug the terminal resistor module onto the right–side connector of the corresponding ECOFAST terminal block. For procedures please refer to *Connecting the ECOFAST connector*. For order numbers please refer to Appendix A.



Figure 3-8 Connecting the ECOFAST connector

Note

The terminating resistor is powered via the electronic/sensor power supply (1L+).

Trouble–free operation of the terminating resistor is only ensured if it is connected to an electronic/sensor power supply (1L+) with a tolerance of range of $\pm 10\%$.

Closing unused sockets

Close all unused ECOFAST sockets with caps in order to achieve protection class IP 65, IP 66 or IP 67. For order numbers please refer to Appendix A.

3.4.4 Wiring the M12, 7/8" terminal block

Properties

- Connect the power supplies and PROFIBUS DP to the M12, 7/8" terminal block:
 - M12 terminals: PROFIBUS DP
 - 7/8" terminals: Power bus
- You can loop the power supplies and PROFIBUS DP through the M12 or 7/8" round sockets.
- Always terminate the first and the last ET 200eco (node) on the PROFIBUS-DP with a terminating resistor.

Requirements

- Always switch off the power supply before you wire the M12, 7/8" terminal block.
- You have set the PROFIBUS address (according to your project configuration. The terminating resistor is enabled if required)

Tools required

Stripping tool and screwdriver for wiring the M12 or 7/8" plug – if you are not using ready–made plugs.

Accessories required

- Prefabricated cable with plug
- If you do not use a ready-made plug:
 - M12: 2–conductor shielded cable (bus cable) and an M12 plug (see Table 3-12)
 - 7/8": 5-conductor cable and 7/8" plug (see Table 3-13)
- M12 terminating resistor for PROFIBUS DP
- For order numbers please refer to Appendix A.

How to wire the M12, 7/8" plug

Table 3-12 or 3-13 shows you the pin assignment of the M12, 7/8" plug:

Table 3-12 Pin assignment of the M12 plug (PROFIBUS DP)

Pin	Assignment	View of the M12 plug (wiring side)	
1	Power supply + (P5V2)*	Supply DP1 Signal A (green	ר)
2	Data line A (RxD / TxD-N)	$\begin{array}{c c} 2^{\bullet} & \bullet \\ 3 & \bullet \\ 3 & \bullet \\ 6 & \bullet \\ 6$	
3	Data reference potential (M5V2)*	Signal B (red)	
4	Data line B (RxD / TxD-P)	Through–loop DP2 Bus cable (2–wire, shielded)	
		Signal A (greer	ר)
5	Shielding	10 2 Shielding	
Thread	Shielding	Signal B (red)	

* Can only be used for the M12 terminating resistor. It is not permitted to loop the voltage to the next plug via a 5-wire cable.

Table 3-13 Pin assignment of the 7/8" plug (Power bus)

Pin	Assignment	View of the 7/8" plug (wiring side)
1	Ground potential, load voltage sup- ply (2M)	Supply X01
2	Ground potential, sensor power supply (1M)	
3	PE	\sim
		Through–loop X02 5–conductor cable
4	Electronic/sensor power supply (1L+)	2L+
5	Load voltage supply (2L+)	

Note

We recommend you wire the power supply with the cables specified in Appendix A (order no.) ($5x1.5 \text{ mm}^2$ with 7/8" connectors).

If you want to produce a self-made cable, we recommend you use a conductor cross-section of 1.5 mm².

How to wire the M12, 7/8" plug

- 1. Insert the plug (M12 or 7/8") into the corresponding round socket on the terminal block. Ensure that the plug and socket interlock (slot and groove).
- 2. Tighten the knurled screw of the plug.



Figure 3-9 How to wire the M12, 7/8" plug

Caution

It is not permitted to disconnect the 7/8" connector during ET 200eco runtime! Always switch off the load voltage supply (2L+) before you disconnect the 7/8" plug.

M12 How to install the PROFIBUS DP terminating resistor

The first and the last node of a PROFIBUS DP segment must be terminated with a wave impedance.

Always terminate the PROFIBUS DP with an M12 terminating resistor if the ET 200eco is the **last** PROFIBUS node. For order numbers please refer to Appendix A.

- Insert the M12 terminating resistor into the right-side round M12
 Loop-through socket of the terminal block. Make sure it is interlocked correctly.
- 2. Tighten the knurled screw of the M12 terminating resistor module.



Figure 3-10 How to connect the M12 terminating resistor

Closing unused sockets

Close all those sockets with M12 or 7/8" caps, in order to achieve protection class IP 65, IP 66 or IP 67. For order numbers please refer to Appendix A.

3.4.5 How to loop the PROFIBUS DP and the supply voltage

Properties

The terminal block is equipped with one plug for the power bus, one socket for looping the power bus and one socket for PROFIBUS-DP. The power bus connector and the loop–through socket are interconnected internally.

Result: If you disconnect the terminal block during runtime the downstream PROFIBUS nodes can continue operation.



Figure 3-11 Loop-through of the PROFIBUS DP and power bus

Caution

You may only disconnect the terminal block during ET 200eco runtime if none of the outputs are connected to the power supply. Always switch off the load voltage supply (2L+) before you disconnect the terminal block. Protection class IP 65, IP 66 or IP 67 is no longer guaranteed after removal of the terminal block.

Notes on wiring

• When you wire your system, always take into account the influence of cable lengths on the ET 200eco power supply (permitted tolerance, see Chapter 5.4).

Example of the terminal interface ECOFAST:

The voltage loss across a \varnothing 1.5 mm² cable of 10 m length is 2.5 V at 10 A. This is proportional to 0.25 V at 1 A.

- The maximum power rating
 - of the ECOFAST terminal block is 8 A at 1L+ and 10 A at 2L+
 - of the M12, 7/8" terminal block is 6 A at 1L+ and 8 A at 2L+

These values must not be exceeded.



Caution

If you ignore the stipulated maximum power supply currents and required conductor cross-sections, you may cause excessive heating of the cable insulation and contact and damage to your equipment.

4

Commissioning and diagnostics

Chapter overview

Chapter	Торіс		
4.1	ET 200eco configuration	4-2	
4.2	ET 200eco commissioning and startup	4-3	
4.3	Diagnostics with LED display	4-5	
4.4	Diagnostics with STEP 5 and STEP 7	4-8	

4.1 ET 200eco configuration

GSD file

Configure the ET 200eco distributed I/O station via the GSD file. In this GSD file, the ET 200eco is implemented as standard slave in your system. You can download the GSD files

• under the Internet URL http//www.ad.siemens.de/csi_e/gsd

GSD filenames for ET 200eco:

- I/O module 8 DI: Siem80db.gs*
- I/O module 16 DI: Siem80da.gs*
- I/O module 8 DO 2 A: Siem80dd.gs*
- I/O module 16 DO 0.5 A: Siem80fb.gs*
- I/O module 8 DI / 8 DO 2 A: Siem80dc.gs*
- I/Omodule 8 DI / 8 DO-2 1.3 A: Siem80fc.gs*
- * Placeholder for the corresponding language (e.g. German: Siem80db.gsg)

How to implement the GSD file in the configuration software

Table 4-1 below describes how to implement the GSD file in SIMATIC S7 or SIMATIC S5 (COM PROFIBUS) systems.

Step	STEP 7, as of V4.02	COM PROFIBUS, V3.0 and higher ¹
1	Start STEP 7. Open HW Config and call menu command Extras ► Install new GSD file.	Copy the device database (GSD) file for the ET 200eco to the COM PROFIBUS directory: COMPB3\GSD (default setting)
		Copy the bitmap file to directory: COMPB3\BITMAPS
2	In the next dialog block, select the GSD file you want to install and confirm with OK. Result: The field device is displayed in the hardware catalog, under the PROFIBUS–DP directory.	Start COM PROFIBUS. Select menu command File ► Load GSD file . Result: ET 200eco is displayed in the hardware catalog during slave configuration.
3	Configure ET 200eco under STEP 7 (See Integrated Help in STEP 7).	Configure ET 200eco under COM PROFIBUS (See Integrated Help in COM PROFIBUS).

Table 4-1 GSD file Implementation in the configuration software

¹ Other configuration software: refer to the corresponding documentation

4.2 ET 200eco commissioning and startup

Software requirements

Configuration software used	Version	Notes	
STEP 7 V4.02 or higher		You have implemented the GSD file for ET 200eco in STEP 7.	
	V 5.1 or higher; ServicePack 4	The GSD file is included in the scope of delivery.	
COM PROFIBUS	V3.0 or higher	You have implemented the GSD file for ET 200eco in <i>COM PROFIBUS</i> .	
Configuration software for the DP master used		You require the GSD file for ET 200eco.	

Table 4-2 Software required for commissioning

Prerequisite for commissioning

Table 4-3 Prerequisite for commissioning the ET 200eco

Prior activity	See
1. The DP slave is installed	Chapter 2
2. The PROFIBUS address is set at the DP slave	Chapter 2.6
3. The DP slave is wired	Chapter 3
4. The DP slave is configured	Chapter4.1
5. The power supply to the DP master is switched on	The DP master manual
6. The DP master is set to RUN mode	The DP master manual

Commissioning ET 200eco

Table 4-4	Steps for commissioning the DP slave
-----------	--------------------------------------

Step	Procedure	
1.	Switch on the electronic/sensor power supply to the DP slave.	
2.	If required, switch on the load voltage supply.	

ET 200eco startup



Figure 4-1 ET 200eco startup

4.3 Diagnostics with LED display

I/O module



Figure 4-2 LED display on the ET 200eco

Status and error displays SF, BF, ON

Table 4-5	Status and error display with LEDs
-----------	------------------------------------

LEDs			Meaning	Remedy	
SF	BF	ON			
off	off	off	• Either the DP slave's electronic/sensor voltage is missing or too low.	 Switch on the electronic/sensor power supply (1L+) to the DP slave. 	
			Hardware is defective.	Replace the I/O module.	
*	*	on	The DP slave is in POWER ON mode (electronic/sensor power supply).	_	

LEDs			Meaning	Remedy	
SF	BF	ON			
*	on	on	• DP slave is in startup mode.	-	
			 Communication to the DP master is down. The DP slave does not recognize any transmission rate. 	 Check the PROFIBUS DP connection. Check the DP master. 	
			Bus interruptThe DP master is out of operation	 Check all cables of your PROFIBUS DP network. Verify that the PROFIBUS DP connector is seated firmly on the terminal block. 	
off	on	on	• Wrong PROFIBUS address at the configuration plug or address > 99.	• Select a PROFIBUS address between 1 to 99 ¹	
on	off	on	A diagnostic message is queued.Defective hardware in the DP slave.	Evaluate the diagnostic information.	
off	on	on	Configuration data sent to the DP slave by the DP master is incompatible to the physical structure of the DP slave.	Check your DP slave configuration (I/O, PROFIBUS address).	
off	on	on	 The DP slave has recognized the transmission rate, but is not addressed by the DP master. The DP slave was not configured. 	 Check the PROFIBUS address set in the DP slave or in your configuration software. Check the configuration of the DP slave (station type). 	
off	flashes	off	Overload of the ET200eco sensor power supply.	 Check the connected sensors/actuators. Remove the connected sensors/ actuators, one after the other. Result: The BF LED stops flashing and the ON LED is lit when you remove the sensor that has caused the overload. Evidently there is a hardware fault if the BF LED continues to flash even if no more sensors/actuators are connected to the I/O module. 	

	Table 4-5	Status and	error display	with LEDs
--	-----------	------------	---------------	-----------

*

Irrelevant After modification of the PROFIBUS address, you must switch POWER OFF/ POWER ON. The PROFIBUS address is applied after POWER ON. 1

Status display 24 VDC

The 24 VDC LED is lit green after you have connected the load voltage supply 2L+. This LED is only available for I/O module 8 DO 2 A, 8 DI / 8 DO 2 A and I/O module 8 DI / 8 DO-2 1.3 A.

Channel status display

The status of each input/output of the ET 200eco is displayed by a corresponding separate LED. The LED is lit green after the input/output is enabled.

- I/O module 8 DI: 8 input status LEDs
- I/O module 16 DI: 16 input status LEDs
- I/O module 8 DO 2 A: 8 status LEDs for the outputs
- I/O module 16 DO 0,5A: 16 status LEDs for the outputs
- I/O module 8 DI / 8 DO 2 A and I/O module 8 DI / 8 DO-2 1.3 A: 8 status LEDs for the inputs and 8 status LEDs for the outputs

4.4 ET 200eco diagnostics

Slave diagnostics

The slave diagnostics function in accordance with IEC 61784-1:2002 Ed1 CP 3/1. For all DP slaves that operate in accordance to this standard, the slave diagnostics can be read out with *STEP 5* or *STEP 7* in conjunction with the DP master.

4.4.1 Reading diagnostic data

Options for reading diagnostic data

Table 4-6 Reading dia	gnostics data of ET 200e	co under STEP 7 and STEP	5
PLC with DP master	Block or tabs under STEP 7	Application	See
SIMATIC S7/M7/C7	"DP slave diagnostics" tab	Display slave diagnostic data in plain text on the <i>STEP 7</i> user interface	"Hardware diagnostics" in the <i>STEP 7</i> Online Help
	SFC 13 "DP NRM_DG"	Fetching diagnostics data from the slave (save to the database of the user program)	For information on the structure please refer to Chapter 4.4.2; SFC, see the System and standard functions reference manual
	FB 125/FC 125	Slave diagnostics evaluation	Download FB/FC 125 under the Internet URL: http://www.ad.siemens.de/ simatic-cs, product ID = 387 257
SIMATIC S5 with IM 308-C as DP master	FB 192 "IM308C"	Fetching diagnostics data from the slave (save to the database of the user program)	For installation information please refer to Chapter 4.4.2; FB, see the <i>Distributed I/O</i> <i>station ET 200</i> Manual Download FB/FC 192 under the Internet URL: http://www.ad.siemens.de/ simatic-cs, product ID = 113 141
SIMATIC S5 with S5-95U as DP master	FB 230 "S_DIAG"		For installation information please refer to Chapter 4.4.2; FB, see the <i>Distributed I/O</i> <i>station ET 200</i> Manual

Table 4-6 Reading diagnostics data of ET 200eco under STEP 7 and STEP 5

Example of how to fetch slave diagnostics data with SFC 13 "DPNRM_DG"

This example shows you how to use SFC 13 to view diagnostics data of a DP slave in the *STEP* 7 user program.

Assumptions

For this STEP 7 user program we shall assume that:

- The diagnostics address of ET 200eco is 1022 (3FE_H).
- Slave diagnostics data will be written to DB 82: starting at address 0.0, with a length of 13 bytes.
- Slave diagnostics data consists of 13 bytes.

STEP 7 user program

STL	Explanation
CALL SFC 13	
REQ :=TRUE LADDR :=W#16#3FE RET_VAL :=MW 0 RECORD :=P#DB82.DBX 0.0 BYTE 13 BUSY :=M2.0	Request to read Diagnostics address of ET 200eco RET_VAL of SFC 13 Diagnostics data record in DB 82 OB1 performs several read access cycles

Example of how to use FB 192 "IM308C" to read slave diagnostic data

This example shows you how to use SFC 192 to view diagnostics data of a DP slave in the STEP 5 *user program.*

Assumptions

For this STEP 5 user program we shall assume that:

- The DP master IM 308-C uses page frames 0 to 15 (Number 0 of IM 308-C).
- The DP slave's PROFIBUS address is "3".
- Slave diagnostics data are to be written to DB 20. You can also use any other DB.
- Slave diagnostics data consists of 13 bytes.

STEP 5 user program

STL			Explanation
	:A	DB 30	
	:SPA	FB 192	
Name	:IM308	C	
DPAD	:	KH F800	Default address area of IM 308-C
IMST	:	KY 0, 3	IM ID = 0, PROFIBUS address of the DP slave = 3
FCT	:	KC SD	Function: Read slave diagnostics data
GCGR	:	KM 0	not evaluated
TYP	:	KY 0, 20	S5 data area: DB 20
STAD	:	KF +1	Diagnostic data starting at dataword 1
LENG	:	KF -1	Diagnostic length = wildcard length (all permitted
ERR	:	DW 0	bytes)
			Error code written to DW 0 of DB 30

4.4.2 Structure of ET 200eco slave diagnostics

Byte 0 Byte 1 Byte 2	Station status 1 to 3
Byte 3	Master PROFIBUS address
Byte 4 Byte 5	80 _H High byte Dx _H Low byte Manufacturer ID (see Table 4-10)
Byte 6 Byte 7	Device-specific diagnostic data
Byte 8 Byte 9 Byte 10 Byte 11 Byte 12	$ \begin{array}{c} 00_{H}\\ 00_{H}\\ 00_{H}\\ 00_{H}\\ 00_{H} \end{array} $

Structure of ET 200eco slave diagnostic data

Figure 4-3 Structure of ET 200eco slave diagnostics data

4.4.3 Station status 1 to 3

Definition

Station status 1 to 3 provides an overview of the status of a DP slave.

Station status 1

Table 4-7	Structure of the station status 1(byte 0) ET 200eco
-----------	---

Bit	Meaning	Cause / Remedy
0	 The DP master can not access the DP slave. This bit is always "0" on the DP slave. 	 Is the correct PROFIBUS address set on the DP slave? Is the bus connector plugged in? Is the power supply to the DP slave switched on? Correct setup of the RS485 repeater? A RESET was performed on the DP slave (off/on)?
1	1: The DP slave is not ready to ex- change data.	• Wait, the DP slave is currently starting up.
2	1: Configuration data sent to the DP slave by the DP master is incompa- tible to the physical structure of the DP slave.	• Has the correct station type or configuration of the DP slave been entered in the configuration software?
3	0: The bit is always "0".	
4	1: The DP slave does not support the requested function (e.g. SYNC/FREEZE).	Check the configuration.
5	1: When the station status is being read from the DP master, is the bit "1"?	The DP master is unable to interpret the DP slave's answer.
6	1: The DP slave type is incompatible with the software configuration.	• Compare the program and the actual setup.
7	1: The DP slave parameters were as- signed by a different DP master (not by the DP master currently acces- sing the DP slave).	 The bit is always 1 when you access the DP slave from a PG or other DP master, for example. The PROFIBUS address of the DP master that has assigned the DP slave parameters is found in the diagnostic byte "Master PROFIBUS address".

Station status 2

Bit	Meaning
0	1: The DP slave must be reconfigured.
1	1: A diagnostic message is queued. The DP slave will not operate unless the error is eliminated (static diagnostic message).
2	1: The bit is always "1" on the DP slave.
3	1: The watchdog is activated for this DP slave.
4	1: The DP slave has received a "FREEZE" control command.*
5	1: The DP slave has received a "SYNC" control command.
6	0: The bit is always "0".
7	1: When the station status is being read from the DP master, the bit is "1" if the DP slave has been disabled in the DP master. The DP slave is disabled; in other words, it is isolated from the current process.

Table 4-8 Structure of station status 2 (byte 1) ET 200eco

* When the control command "FREEZE" is set, the diagnostic messages are also frozen.

Station Status 3

Bit	Meaning
0 to 7	0: The bits are always "0".

4.4.4 Master PROFIBUS address

Definition

Diagnostic byte 3 contains the PROFIBUS address of the master that:

- assigned the parameters to the DP slave and
- has read and write access to the DP slave.

FF_H in byte 3

The master PROFIBUS address value FF_H in byte 3 indicates that the DP master has not assigned parameters to the DP slave.

4.4.5 Manufacturer ID

Definition

The manufacturer ID contains a code that describes the DP slave type.

Manufacturer ID

_			
В	yte 4	Byte 5	Manufacturer ID for
	80 _H	DB _H	ET 200eco 8 DI
	80 _H	DA _H	ET 200eco 16 DI
	80 _H	DD _H	ET 200eco 8 DO 2 A
	80 _H	FB _H	ET 200eco 16 DO 0.5 A
	80 _H	DC _H	ET 200eco 8 DI / 8 DO 2 A
	80н	FCH	ET 200eco 8 DI / 8 DO-2 1.3 A

Table 4-10 Structure of the ET 200eco manufacturer ID (bytes 4 and 5)

4.4.6 Device–specific diagnostic data

Definition

Device–specific diagnostic data allows you to recognize a short–circuit at the electronic/sensor power supply (1L+) or missing load voltage supply (2L+). The header contains information on the length of device–specific diagnostic data.

Device-specific diagnostic data

Structure of device-specific diagnostic data for ET 200eco:



Figure 4-4 Structure of ET 200eco device–specific diagnostics data

General technical data

What are general technical data?

These general technical data contain the standards and test values the ET200eco distributed I/O station is compliant with, or the criteria for testing the ET 200eco distributed I/O station.

Chapter overview

Chapter	Торіс	
5.1	Standards and approvals	5-2
5.2	EMC compatibility, shipping and storage conditions	5-3
5.3	Mechanical and ambient climatic conditions	5-5
5.4	Information on isolation tests, protection class, degree of protection and rated voltages of ET 200eco	5-7

5.1 Standards and approvals

PROFIBUS standard

The ET 200eco distributed I/O system is based on the IEC 61784-1:2002 Ed1 CP 3/1 standard.

IEC 61131

The ET 200eco distributed I/O system is compliant with requirements and criteria according to IEC 61131-2.

CE label

Our products meet the requirements and protection objectives of the following EC directives and comply with the harmonized European standards (EN) for PLCs that have been published in the Official Gazettes of the European Community:

- 89/336/EEC "EMC compatibility" (EMC guideline)
- 73/23/EEC "Electrical equipment designed for operation within specific voltage limits" (Low–voltage guideline

EU Declarations of Conformity are kept available for relevant authorities at:

Siemens Corporation, Automation and Drives A & D AS RD 4, PO Box 1963 D-92209 Amberg

Mark for Australia



Our products are compliant with AS/NZS 2064 (Class A).

cULus approval (in preparation)

Underwriters Laboratories Inc. in accordance with



- UL 508 (Industrial Control Equipment)
- CSA C22.2 No. 142 (Process Control Equipment)
5.2 EMC compatibility, shipping and storage conditions

Definition

EMC compatibility refers to the ability of electrical equipment to operate efficiently in an electromagnetic environment, without emission of electromagnetic disturbance.

The ET 200eco distributed I/O station is also compliant with EMC legislation of the European common market. Prerequisite is here that the electrical installation of the ET 200eco distributed I/O station is compliant with corresponding regulations and guidelines.

Disturbance spikes

The table below shows EMC compatibility of the ET 200eco distributed I/O station with reference to disturbance spikes.

Disturbance spikes	Tested with	corresponding severity
Electrostatic discharge according to IEC 61000-4-2.	8 kV 6 kV	3 (air discharge) 2 (contact discharge)
Burst pulses (fast transient disturbance va- riables) according to	2 kV (power supply line)	3
High–energy surge pulse according to IEC 6 Applies only to lightning protection elements (see the DP master manual and the descripti <i>PROFIBUS Networks</i>)		
 asymmetrical coupling 	2 kV (power supply line) 2 kV (signal/data line)	3
 symmetrical coupling 	1 kV (power supply line) 1 kV (signal/data line)	

Sinusoidal disturbance variables

The table below shows the EMC compatibility of the ET 200eco distributed I/O station in relation to sinusoidal disturbances.

RF coupling toIEC 6100043 Electromagnetic RF field		RF coupling to IEC 61000
amplitude-modulated	pulse-modulated	
80 to 1000 MHz	900 MHz ±5 MHz	0.15 to 80 MHz
10 V/m		10 V _{r.m.s.} , unmodulated
80 % AM (1 kHz)	50 % ED	80 % AM (1 kHz)
200 Hz repetitive frequency		150 Ω Source impedance

Emission of RF interference

Emitted electromagnetic interference to EN 55011: Limit value class A, Group 1 (measured at a distance of 10 m).

Frequency	Emitted interference
from 30 to 230 MHz	< 40 dB (µV/m)Q
from 230 to 1000 MHz	< 47 dB (μV/m)Q

Shipping and storage conditions

The shipping and storage conditions for the ET 200eco distributed I/O station exceed IEC 61131-2 requirements. The specifications below apply to modules stored or shipped in their original packaging.

Type of condition	Permitted range
Drop test	≤ 1 m
Temperature	– 40 °C to + 70 °C
Temperature change	20 K/h
Atmospheric pressure	1080 to 660 hPa (proportional to an altitude of -1000 to 3500 m)
Relative humidity	5 to 95 %, without condensation

5.3 Mechanical and climatic ambient conditions

Climatic ambient conditions

The following climatic ambient conditions apply:

Ambient conditions	Fields of application	Remarks
Temperature range	0 to 55 °C	all mounting positions
Temperature change	10 K/h	
Relative humidity	15 to max. 95 %	without condensation
Atmospheric pressure	1080 to 795 hPa	Proportional to an altitude of -1000 to 2000 m
Contaminant concentration	SO_2 : < 0.5 ppm; relative humidity < 60 %, no dewing H_2S : < 0.1 ppm; relative humidity < 60 %, no dewing	Test: 10 ppm; 4 days 1 ppm; 4 days

Mechanical ambient conditions

The sine-wave diagrams in the table below specify mechanical ambient conditions.

Frequency range	Continuous	test at
$10 \le f \le 58 \text{ Hz}$	0.35 mm amplitude	0.75 mm amplitude
$58 \le f \le 150 \text{ Hz}$	5 g constant acceleration	10 g constant acceleration

Tests for determining mechanical ambient conditions

The table below provides information on the type and scope of the tests for mechanical ambient conditions.

Test object	Testing stan- dard	terminal blocks and electronic modules	
Vibration	Vibration test ac- cording to IEC 60068-2-8	Type of oscillation: Frequency test cycles at a rate of change of 1 oc- tave/minute. 10 Hz \leq f \leq 58 Hz, constant amplitude of 0.75 mm 58 Hz \leq f \leq 150 Hz, constant acceleration of 10 g Duration of the vibration test: 10 frequency test cycles per axis for each one of the correlated vertical axes	
Surge	Surge test to IEC 60068-2-27	Type of surge: Sinusoidal, half–wave Surge strength: Peak value = 30 g, duration = 18 ms Direction of surge: Three surges in both +/– directions on each of the three correlated vertical axes	
Continuous surge	Surge test to IEC 60068-29	Type of surge: Sinusoidal, half–wave Surge strength: Peak value = 25 g, duration = 6 ms Direction of surge: 1000 surges in both +/– directions on each of the three correlated vertical axes	

5.4 Specification of isolation tests, protection class, type of protection and rated voltage for ET 200eco

Test voltage

The dielectric strength is verified during routine testing using the following test voltages according to IEC 61131-2:

Circuits with a rated voltage of ${\rm U_e}$ against other circuits or ground	Test voltage
< 50 V	500 VDC
< 150 V	2500 VDC
< 250 V	4000 VDC

Degree of contamination/overvoltage category according to IEC 61131

- Degree of contamination 2
- Overvoltage category
 - at U_N = 24 VDC: II

Degree of protection IP 65

Degree of protection according to IEC 529

- Protected against the ingress of dust and full touch protection
- Jet water-proof from all directions to the case (the water must not cause damage).

Degree of protection IP 66 and 67

Degree of protection according to IEC 529

- Protected against the ingress of dust and full touch protection
- IP 66: Protected for operation in heavy sea or under strong water jets (ingress of water must be restricted to harmless quantities).
- IP 67: Water-proof. Immersion test of the case in water under specified conditions of pressure and duration (ingress of water must be restricted to harmless quantities).

Rated operating voltage

The table below shows the rated voltage and corresponding tolerances for the operation of the ET 200eco distributed I/O station.

Rated voltage	Tolerance range
24 VDC	20.4 to 28.8 VDC

Note

Trouble–free operation of the terminating resistor is only ensured if it is connected to an electronic/sensor power supply (1L+) with a tolerance of range of $\pm 10\%$.

6

Technical data

The ET 200eco system consists of various components. In this chapter you will find the technical data of those components.

Chapter overview

Chapter	Торіс	Page
6.1	ECOFAST terminal block (6ES7 194-3AA00-0AA0)	6-2
6.2	Terminal block M12, 7/8" (6ES7 194-3AA00-0BA0)	6-4
6.3	I/O module 8 DI (6ES7 141-3BF00-0XA0)	6-7
6.4	I/O module 16 DI (6ES7 141-3BH00-0XA0)	6-10
6.5	I/O module 8 DO 2A (6ES7 142-3BF00-0XA0)	6-13
6.6	I/O module 16 DO 0.5 A (6ES7 142-3BH00-0XA0)	6-16
6.7	I/O module 8 DI / 8 DO 2A (6ES7 143-3BH00-0XA0)	6-19
6.8	I/O module 8 DI / 8 DO 1.3 A (6ES7 143-3BH00-0XA0)	6-22

6.1 ECOFAST terminal block (6ES7 194-3AA00-0AA0)

Properties

Characteristics of the ECOFAST terminal block:

- Can be plugged in and screwed on to any I/O module.
- Connection to power supplies and PROFIBUS DP via ECOFAST connector (at socket X01, supply lines).
- Looping the power bus and PROFIBUS DP to the next PROFIBUS node via additional ECOFAST connector (at socket X02, loop-through).
- Internally interconnected supply line socket X01 and loop–through socket X02 (T functionality).
- Adjustable PROFIBUS address (1 to 99) via configuration plug.

Note

The ECOFAST terminal block may only be operated with the I/O modules 6ES7 14*-3B*00-0XA0.

Pin assignment of the ECOFAST sockets

The table below shows the pin assignment of the two ECOFAST sockets for the connection to the power supplies and PROFIBUS DP.

Pin	Assignment of the infeed socket X01	Assignment of the through–loop socket X02	View of the socket (Front view of the terminal blocks)
Α	PROFIBUS DP Signal A		
В	PROFIBUS DP Signal B		
1	Electronic/sensor power supply (1L+)		
2	Ground potential, sensor power supply (1M)		
3	Ground potential, load voltage supply (2M)		
4	Load voltage supply (2L+)		

Table 6-1 Pin-out of the sockets X01 and X02

Block diagram



The figure below shows the ECOFAST terminal block.

Figure 6-1 Block diagram of the ECOFAST terminal block

Technical data

Dimensions and weight		Power loss
Dimensions W \times H \times D (mm)	$79 \times 60 \times 30$	Power loss of the module typically 2 W ¹
Weight	approx. 313 g	Power loss depends on the feed–through current across the terminal block.

Note

The maximum power supply current may not exceed 8 A at 1L and 10 A at 2L+.

6.2 Terminal block M12, 7/8" (6ES7 194-3AA00-0BA0)

Properties

Characteristics of the M12, 7/8" terminal block:

- Can be plugged in and screwed on to any I/O module.
- Connection of
 - PROFIBUS DP via M12 connector (at infeed socket DP1)
 - the power supplies via 7/8" connector (at infeed socket X01)
- PROFIBUS DP and power bus loop-through connection to the next PROFIBUS node via an additional M12 or 7/8" connector (at loop-through socket DP2 or X02).
- Internal connection of infeed socket DP1 or X01 and loop-through socket DP2 or X02 (T functionality).
- Adjustable PROFIBUS address (1 to 99, via two rotary selector switches).

Note

The M12, 7/8" terminal block may only be operated with the I/O modules 6ES7 14*-3B*00-0XA0.

Pin assignment of the M12-, 7/8" sockets

The table below shows the pin assignment of the two M12, 7/8" sockets for the connection to the power supplies and PROFIBUS DP.

Dia	Assistant of the M40 sector DD4	10	af the scheme
Pin	(infeed) and DP2 (loop–through) (PROFIBUS DP)	(Front view of	of the plug the terminal blocks)
1	Power supply + (P5V2)	Supply DP1	Through-loop DP2
2	Data line A (RxD / TxD-N)		
3	Data reference potential (M5V2)	$\begin{pmatrix} 2^{\bullet} & \bullet 1 \\ \bullet & \bullet 5 \end{pmatrix}$	
4	Data line B (RxD / TxD-P)		4 03
5	Shielding	Pin	Socket
Thread	Shielding] ••••	COUNCI

Table 6-2 Pin-out of the plugs DP1 and DP2 (M12)

Table 6-3	Pin-out of the c	onnectors X01	and X02	(7/8")

Pin	Pin out of the 7/8" sockets X01 (infeed) and X02 (loop–through) (PROFIBUS-DP)	View of the plug (Front view of the terminal blocks)
1	Ground potential, load voltage supply (2M)	Supply Through–loop X01 X02
2	Ground potential, electronic/sensor power supply (1M)	$ \begin{pmatrix} 0 & 1 & 5 \\ 0 & 2 & 4 \end{pmatrix} $
3	PE	
4	Electronic/sensor power supply (1L+)	Pi Socke
5	Load voltage supply (2L+)	n t

Block diagram



The figure below shows the M12, 7/8" terminal block.

Technical dataterminal block"#

Dimensio	ons and weight	Power loss
Dimensions W \times H \times D (mm)	79 × 60 × 29	Power loss of the module typically 2 W ¹
Weight	approx. 392 g	Power loss depends on the feed-through current across the terminal block.

Note

The maximum power supply current may not exceed 6 A at 1L+ and 8 A at 2L+.

6.3 I/O module 8 DI (6ES7 141-3BF00-0XA0)

Properties

Characteristics of the I/O module 8 DI:

- 8 digital inputs
- Input nominal voltage DC 24 V
- suitable for switches and proximity switches (BEROs)

Pin assignment of the DI sockets

The table below shows the pin assignment of the eight digital input sockets.

T 1 1 0 4	D' (()			V4 · V0
Table 6-4	Pin-out of the	digital input	SOCKETS	X1 to X8

Pin	Assignment of socket X1	Assignment of socket X2	Assignment of socket X3	Assignment of socket X4	View of the socket (Front view)
1	24 V sensor powe	r supply			
2	n.c.				
3	Ground potential of	of the sensor power	supply		
4	Input signal channel 0	Input signal channel 1	Input signal channel 2	Input signal channel 3	
5	PE				
Pin	Assignment of socket X5	Assignment of socket X6	Assignment of socket X7	Assignment of socket X8	
1	24 V sensor powe	r supply			
2	n.c.				
3	Ground potential of	of the sensor power	supply		
4	Input signal channel 4	Input signal channel 5	Input signal channel 6	Input signal channel 7	
5	PE	•	·	·	1

Block diagram



The figure below shows the block diagram of I/O module 8 DI.

Figure 6-3 Block diagram of I/O module 8 DI

Technical data of I/O module 8 DI

Dimensions and weight		Status, interrupts, diagnostics		
Dimensions W \times H \times D (mm)	60 × 210 × 28	Status display	Green LED per channel	
Weight	approx. 210 g	Interrupts	no	
Module-spe	cific data	Diagnostic functions		
Transmission rates	9.6/19.2/45.45/93.75/	Group error display	Red LED (SF)	
	187.5/500 kbps 1.5/3/6/12 Mbps	Channel error display	no	
Bus protocol	PROFIBUS-DP	 Read access to diagnostics data 	possible	
Number of channels	8 digital inputs	Encoder power s	upply outputs	
Cable length		Number of outputs	8	
Unshielded	max. 30m		up to 55 °C max 1°	
Manufacturer ID	80DB _H	Output current	(cumulative current)	
Voltages, curren	ts, potentials	Short-circuit protection	yes, electronic	
Rated voltage of the	24 VDC	Encoder sele	ection data	
supply 1L+		Input voltage		
Reverse polarity	ves	Rated value	24 VDC	
protection	,	 for "1" signal 	13 to 30 V	
Number of inputs that can	8	 for "0" signal 	– 3 to 5 V	
be addressed		Input current		
simultaneously		• at signal 1	typically 7 mA	
all mounting positions		• at signal 0		
up to 55° C		Input delay		
Isolated potential		• "0" to "1" transition	typically 3 ms	
• between channels	no	• "1" to "0" transition	typically 3 ms	
between PROFIBUS DP and other circuit	yes	Input characteristic curve	according to IEC 61131, Type 1	
Permitted potential		Connection of 2–wire BERO	possible	
difference		 permitted no–load 	max. 1.5 mA	
between different circuits	75 VDC, 60 VAC	current		
Isolation test voltage	500 VDC			
Current load				
 on power supply 1L+ 	typically 70 mA			

Power loss of the module typically 2.4 W

6.4 I/O module 16 DI (6ES7 141-3BH00-0XA0)

Properties

Characteristics of I/O module 16 DI:

- 16 digital inputs
- Input nominal voltage DC 24 V
- suitable for switches and proximity switches (BEROs)

Pin assignment of the DI sockets

The table below shows the pin assignment of the eight digital input sockets.

Pin	Assignment of socket X1	Assignment of socket X2	Assignment of socket X3	Assignment of socket X4	View of the socket (Front view)
1	24 V sensor powe	er supply			
2	Input signal channel 8	Input signal channel 9	Input signal channel 10	Input signal channel 11	⊘ 0 2
3	Ground potential of	of the sensor power	supply		(◯1 ◯5 ◯3
4	Input signal channel 0	Input signal channel 1	Input signal channel 2	Input signal channel 3	04
5	PE				
Pin	Assignment of socket X5	Assignment of socket X6	Assignment of socket X7	Assignment of socket X8	
1	24 V sensor powe	er supply			
2	Input signal channel 12	Input signal channel 13	Input signal channel 14	Input signal channel 15	
3	Ground potential of	of the sensor power	supply		
4	Input signal channel 4	Input signal channel 5	Input signal channel 6	Input signal channel 7	
5	PE	1		1	

Table 6-5 Pin-out of the digital input sockets X1 to X8

Block diagram



The figure below shows the block diagram of I/O module 16 DI.

Figure 6-4 Block diagram of I/O module 16 DI

Technical data of I/O module 16 DI

Dimensions and weight		Status, interrupts, diagnostics		
Dimensions W \times H \times D (mm)	60 × 210 × 28	Status display	Green LED per channel	
Weight	approx. 210 g	Interrupts	no	
Module-spe	cific data	Diagnostic functions		
Transmission rates	9.6/19.2/45.45/93.75/	Group error display	Red LED (SF)	
	187.5/500 kbps 1.5/3/6/12 Mbps	Channel error display	no	
Bus protocol	PROFIBUS-DP	 Read access to diagnostics data 	possible	
Number of channels	16 digital inputs	Encoder power s	upply outputs	
Cable length		Number of outputs	8	
Unshielded	max. 30m		up to 55 °C max 1A	
Manufacturer ID	80DA _H		(cumulative current)	
Voltages, curren	ts, potentials	Short-circuit protection	yes, electronic	
Rated voltage of the	24 VDC	Encoder sele	ection data	
supply 1L+		Input voltage		
Reverse polarity	Ves	Rated value	24 VDC	
protection	<i>y</i> 00	 for "1" signal 	13 to 30 V	
Number of inputs that can	16	 for "0" signal 	– 3 to 5 V	
be addressed		Input current		
simultaneously		 at signal 1 	typically 7 mA	
all mounting positions		• at signal 0		
up to 55° C		Input delay		
Isolated potential		• "0" to "1" transition	typically 3 ms	
 between channels 	no	• "1" to "0" transition	typically 3 ms	
between PROFIBUS DP and other circuit components	yes	Input characteristic curve	according to IEC 61131, Type 1	
Permitted potential		Connection of 2–wire BERO	possible	
between different circuits	75 VDC, 60 VAC	permitted no–load current	max. 1.5 mA	
Isolation test voltage	500 VDC			
Current load				
• on power supply 1L+	typically 70 mA			
1				

Power loss of the module typically 3.6 W

6.5 I/O module 8 DO 2A (6ES7 142-3BF00-0XA0)

Properties

The I/O module 8 DO 2A has the following features:

- 8 digital outputs
- output current = 2 A per output
- rated load voltage = 24 VDC
- suitable for magnetic solenoid valves, DC contactors and signal lamps

Pin assignment of the DO sockets

The table below shows the pin assignment of the eight digital output sockets.

Pin	Assignment of socket X1	Assignment of socket X2	Assignment of socket X3	Assignment of socket X4	View of the socket (Front view)
1	n.c.				
2	n.c.				
3	Ground potential,	load voltage supply	(2M)		
4	Output signal Channel 0	Output signal Channel 1	Output signal Channel 2	Output signal Channel 3	04
5	PE				
Pin	Assignment of socket X5	Assignment of socket X6	Assignment of socket X7	Assignment of socket X8	
1	n.c.				
2	n.c.				
3	Ground potential,	load voltage supply	(2M)		
4	Output signal Channel 4	Output signal Channel 5	Output signal Channel 6	Output signal Channel 7	

Table 6-6 Pin-out of the digital output sockets X1 to X8

Block diagram



The following figure shows the block diagram of the I/O module 8 DO 2A.

Figure 6-5 Block diagram of I/O module 8 DO 2A

Technical data of I/O Module 8 DO 2A

Dimensions and weight		Status, interrupts, diagnostics		
Dimensions $W \times H \times D$ (mm)	$60 \times 210 \times 28$	Status display	Green LED per channel	
Weight	approx. 210 g	Interrupts	no	
Module-spe	cific data	Diagnostic functions		
Transmission rates	9.6/19.2/45.45/93.75/	Group error display	Red LED (SF)	
	187.5/500 kbps 1.5/3/6/12 Mbps	Channel error display	no	
Bus protocol	PROFIBUS-DP	Read access to diagnostics data	possible	
Number of channels	8 digital outputs	Actuator sele	ection data	
Cable length				
Unshielded	max. 30m	 at signal 1 	min. 2L+ (– 0.8 V)	
Manufacturer ID	80DD _H	Output current	(),	
Voltages, curren	its, potentials	 at signal 1 		
Rated voltage of the	24 VDC	Rated value	2 A	
electronic/sensor power		Permitted range	5 mA to 2.4 A	
Reverse polarity protection	yes	 at "0" signal (residual current) 	Max. 0.5 mA	
Rated load voltage 2L+		Resistive load range	12 Ω to 4 k Ω	
Reverse polarity		Lamp load	max. 10 W	
protection	yes	Parallel connection of two outputs		
Cumulative current of the outputs		 for load control redundancy 	possible	
all mounting positions		 for power increase 	No	
up to 55° C	each 4 A ^{1), 2)}	Digital input control	no	
Isolated potential			possible	
 between channels 	no	Switching frequency	may 100 Hz	
 between PROFIBUS DB and other circuit 	yes			
components		according to IEC	111dX. 0.3 112	
Permitted potential		947-5-1, DC13	may 1 Hz	
difference		• lamp load		
 between different circuits 	75 VDC, 60 VAC	inductive cut–off voltage	typically 2L+ (- 44 V)	
Isolation test voltage	500 VDC	Short circuit protection of	Voc. alactronia	
Current load		outputs		
 on power supply 1L+ on load voltage supply 	typically 70 mA	response threshold	typically 4 A (per channel)	
2L+	typically 60 mA			
Power loss of the module	typically 4 W	 4 A cumulative current for and X7; 4 A cumulative 	or sockets X1, X3, X5, current for sockets X2,	

X4, X6, and X8.
 ²⁾ Please note the current capacity of the cable

6.6 I/O module 16 DO 0.5 A (6ES7 142-3BH00-0XA0)

Properties

The I/O module 16 DO 0.5 A has the followng features:

- 16 digital outputs
- output current = 0,5 A per output
- rated load voltage = 24 VDC
- suitable for magnetic solenoid valves, DC contactors and signal lamps

Pin assignment of the DO sockets

The table below shows the pin assignment of the eight digital output sockets.

Pin	Assignment of socket X1	Assignment of socket X2	Assignment of socket X3	Assignment of socket X4	View of the socket (Front view)
1	n.c.				
2	Output signal Channel 8	Output signal Channel 9	Output signal Channel 10	Output signal Channel 11	⊘
3	Ground potential,	load voltage supply	(2M)		(◯1 ◯5 ◯3
4	Output signal Channel 0	Output signal Channel 1	Output signal Channel 2	Output signal Channel 3	04
5	PE				
Pin	Assignment of	Assignment of	Assignment of	Assignment of	
	SOCKET AS	SUCKEL AU	SOCKEL AT	SOCKET NO	
1	n.c.	SUCKELAU	SUCKEL AT	SUCKELAU	
1 2	n.c. Output signal Channel 12	Output signal Channel 13	Output signal Channel 14	Output signal Channel 15	
1 2 3	n.c. Output signal Channel 12 Ground potential,	Output signal Channel 13 load voltage supply	Output signal Channel 14 (2M)	Output signal Channel 15	
1 2 3 4	n.c. Output signal Channel 12 Ground potential, Output signal Channel 4	Output signal Channel 13 load voltage supply Output signal Channel 5	Output signal Channel 14 (2M) Output signal Channel 6	Output signal Channel 15 Output signal Channel 7	

Table 6-7 Pin-out of the digital output sockets X1 to X8

Block diagram



The following figure shows the block diagram of the I/O module 16 DO 0.5 A.

Figure 6-6 Block diagram of I/O module 16 DO 0.5 A

Technical Data of I/O Module 16 DO 0.5 A

Dimensions and weight Status, inter		Status, interrupt	upts, diagnostics	
Dimensions W \times H \times D (mm)	60 × 210 × 28	Status display	Green LED per channel	
Weight	approx. 210 g	Interrupts	no	
Module-spe	cific data	Diagnostic functions		
Transmission rates	9.6/19.2/45.45/93.75/	Group error display	Red LED (SF)	
	187.5/500 kbps 1.5/3/6/12 Mbps	Channel error display	no	
Bus protocol	PROFIBUS-DP	 Read access to diagnostics data 	possible	
Number of channels	16 digital outputs		ection data	
Cable length				
Unshielded	max. 30m	at signal 1	min 2I + (- 0.8 V)	
Manufacturer ID	80FB _H			
Voltages, curren	ts, potentials	 at signal 1 		
Rated voltage of the	24 VDC	Rated value	0.5 A	
electronic/sensor power		Permitted range	5 mA to 1 A	
Reverse polarity protection	yes	 at "0" signal (residual current) 	Max. 0.1 mA	
Potection Potection		Resistive load range	12 Ω to 4 k Ω	
Boyorso polarity	24 000	Lamp load	Max. 5 W	
protection	yes	Parallel connection of two outputs		
Cumulative current of the outputs		 for load control redundancy 	possible	
all mounting positions		 for power increase 	No	
up to 55° C	4 A ¹⁾	Digital input control	nossible	
Isolated potential		Switching frequency	possible	
 between channels 	no	resistive load	may 100 Hz	
between PROFIBUS DP and other circuit components	yes	 inductive load according to IEC 	max. 0.5 Hz	
Permitted potential		947-5-1, DC13		
difference		lamp load	max. 1 Hz	
 between different circuits 	75 VDC, 60 VAC	Limiting (internal) of inductive cut–off voltage	typically 2L+ (– 47 V)	
Isolation test voltage	500 VDC	to		
Current load		Short-circuit protection of	Yes, electronic	
 on power supply 1L+ on load voltage supply 	typically 70 mA	 response threshold 	typically 1,4 A (per channel)	
2L+	typically 80 mA			
Power loss of the module	typically 4 W	¹⁾ Please note the current	capacity of the cable	

6.7 I/O module 8 DI / 8 DO 2 A (6ES7 143-3BH00-0XA0)

Properties

The I/O module 8 DI / 8 DO 2 A has the following features:

- 8 digital inputs
- Input nominal voltage DC 24 V
- suitable for switches and proximity switches (BEROs)
- 8 digital outputs
- output current = 2 A per output
- rated load voltage = 24 VDC
- suitable for magnetic solenoid valves, DC contactors and signal lamps

Pin assignment of the DI sockets

The table below shows the pin assignment of the eight digital input and output sockets.

Table 6-8 Pin-out of the digital input and output sockets X1 to X8

Pin	Assignment of socket X1	Assignment of socket X2	Assignment of socket X3	Assignment of socket X4	View of the socket (Front view)
1	24 V sensor powe	r supply			
2	Input signal channel 0	Input signal channel 1	Input signal channel 2	Input signal channel 3	Ø ● 2
3	Ground potential of	of the sensor/load v	oltage supply		(◯1 ◯5 ◯3
4	Output signal Channel 0	Output signal Channel 1	Output signal Channel 2	Output signal Channel 3	04
5	PE				-
Pin	Assignment of socket X5	Assignment of socket X6	Assignment of socket X7	Assignment of socket X8	
1	24 V sensor powe	r supply			
2	Input signal channel 4	Input signal channel 5	Input signal channel 6	Input signal channel 7	
3	Ground potential of	of the sensor/load v	oltage supply		
4	Output signal Channel 4	Output signal Channel 5	Output signal Channel 6	Output signal Channel 7	
5	PE	•	•		

Block Diagram



The following figure depicts the block diagram of the I/O module 8 DI / 8 DO 2A.

Figure 6-7 Block diagram of I/O module 8 DI / 8 DO 2A

Dimensions a	and weight	Current load	
Dimensions	60 × 210 × 28	• on power supply 1L+	typically 70 mA
$W \times H \times D$ (mm)		on load voltage supply	
Weight	approx. 210 g	2L+	typically 60 mA
Module-spe	cific data	Power loss of the module	typically 5 W
Transmission rates	9.6/19.2/45.45/93.75/	Status, interrupt	s, diagnostics
	187.5/500 kbps 1.5/3/6/12 Mbps	Status display	Green LED per channel
Bus protocol	PROFIBUS-DP	Interrupts	no
Number of channels	8 digital outputs	Diagnostic functions	
Cable length		Group error display	Red LED (SF)
Unshielded	max. 30m	Channel error display	no
Manufacturer ID	80DC _H	 Read access to 	possible
Voltages, curren	its, potentials	diagnostics data	F
Rated voltage of the	24 VDC	Encoder power s	supply outputs
electronic/sensor power supply 1L+		Number of outputs	8
 Reverse polarity protection 	no	Output current	up to 55 °C max. 0,75A (cumulative current)
Rated load voltage 2L+	24 VDC	Short-circuit protection	ves. electronic
			j ,
 Reverse polarity protection 	no	Encoder sele	ection data
Reverse polarity protection	no	Encoder sele	ection data
 Reverse polarity protection Number of inputs that can be addressed 	no 8	Encoder sele Input voltage • Rated value	ection data 24 VDC
 Reverse polarity protection Number of inputs that can be addressed simultaneously 	no 8	Encoder sele Input voltage • Rated value • for "1" signal	24 VDC 13 to 30 V
 Reverse polarity protection Number of inputs that can be addressed simultaneously all mounting positions 	no 8	Encoder sele Input voltage • Rated value • for "1" signal • for "0" signal	24 VDC 13 to 30 V – 3 to 5 V
 Reverse polarity protection Number of inputs that can be addressed simultaneously all mounting positions up to 55° C 	no 8	Encoder sele Input voltage • Rated value • for "1" signal • for "0" signal Input current	24 VDC 13 to 30 V – 3 to 5 V
 Reverse polarity protection Number of inputs that can be addressed simultaneously all mounting positions up to 55° C Cumulative current of the outputs 	no 8	Encoder sele Input voltage • Rated value • for "1" signal • for "0" signal Input current • at signal 1 • at signal 0	ection data 24 VDC 13 to 30 V – 3 to 5 V typically 7 mA
 Reverse polarity protection Number of inputs that can be addressed simultaneously all mounting positions up to 55° C Cumulative current of the outputs all mounting positions 	no 8	Encoder sele Input voltage • Rated value • for "1" signal • for "0" signal Input current • at signal 1 • at signal 0 Input delay	ection data 24 VDC 13 to 30 V – 3 to 5 V typically 7 mA
 Reverse polarity protection Number of inputs that can be addressed simultaneously all mounting positions up to 55° C Cumulative current of the outputs all mounting positions up to 55° C 	no 8 each 4 A ^{1), 2)}	Encoder sele Input voltage • Rated value • for "1" signal • for "0" signal Input current • at signal 1 • at signal 0 Input delay • "0" to "1" transition	ection data 24 VDC 13 to 30 V – 3 to 5 V typically 7 mA typically 3 ms
 Reverse polarity protection Number of inputs that can be addressed simultaneously all mounting positions up to 55° C Cumulative current of the outputs all mounting positions up to 55° C Isolated potential 	no 8 each 4 A ^{1), 2)}	Encoder sele Input voltage • Rated value • for "1" signal • for "0" signal Input current • at signal 1 • at signal 0 Input delay • "0" to "1" transition • "1" to "0" transition	ection data 24 VDC 13 to 30 V – 3 to 5 V typically 7 mA typically 3 ms typically 3 ms
 Reverse polarity protection Number of inputs that can be addressed simultaneously all mounting positions up to 55° C Cumulative current of the outputs all mounting positions up to 55° C Isolated potential between channels 	no 8 each 4 A ^{1), 2)} no	Encoder sele Input voltage • Rated value • for "1" signal • for "0" signal Input current • at signal 1 • at signal 0 Input delay • "0" to "1" transition • "1" to "0" transition Input characteristic curve	24 VDC 13 to 30 V - 3 to 5 V typically 7 mA typically 3 ms typically 3 ms according to IEC 61131, Type 1
 Reverse polarity protection Number of inputs that can be addressed simultaneously all mounting positions up to 55° C Cumulative current of the outputs all mounting positions up to 55° C Isolated potential between channels between PROFIBUS DP and other circuit components 	no 8 each 4 A ^{1), 2)} no yes	Encoder sele Input voltage • Rated value • for "1" signal • for "0" signal Input current • at signal 1 • at signal 0 Input delay • "0" to "1" transition • "1" to "0" transition Input characteristic curve Connection of 2–wire BERO	ection data 24 VDC 13 to 30 V – 3 to 5 V typically 7 mA typically 3 ms typically 3 ms according to IEC 61131, Type 1 possible
 Reverse polarity protection Number of inputs that can be addressed simultaneously all mounting positions up to 55° C Cumulative current of the outputs all mounting positions up to 55° C Isolated potential between channels between PROFIBUS DP and other circuit components Permitted potential difference 	no 8 each 4 A ^{1), 2)} no yes	Encoder sele Input voltage • Rated value • for "1" signal • for "0" signal Input current • at signal 1 • at signal 0 Input delay • "0" to "1" transition Input characteristic curve Connection of 2–wire BERO • permitted no–load current	ection data 24 VDC 13 to 30 V – 3 to 5 V typically 7 mA typically 3 ms according to IEC 61131, Type 1 possible max. 1.5 mA
 Reverse polarity protection Number of inputs that can be addressed simultaneously all mounting positions up to 55° C Cumulative current of the outputs all mounting positions up to 55° C Isolated potential between channels between PROFIBUS DP and other circuit components Permitted potential difference between different circuits 	no 8 each 4 A ^{1), 2)} no yes 75 VDC, 60 VAC	Encoder sele Input voltage • Rated value • for "1" signal • for "0" signal Input current • at signal 1 • at signal 0 Input delay • "0" to "1" transition • "1" to "0" transition Input characteristic curve Connection of 2–wire BERO • permitted no–load current 1) 4 A cumulative current for	24 VDC 13 to 30 V – 3 to 5 V typically 7 mA typically 3 ms typically 3 ms according to IEC 61131, Type 1 possible max. 1.5 mA

Technical Data of the I/O Module 8 DI / 8 DO 2A

²⁾ Please note the current capacity of the cable

Actuator sele	ection data
Output voltage	
 at signal 1 	min. 2L+ (– 0.8 V)
Output current	
 at signal 1 	
Rated value	2 A
Permitted range	5 mA to 2.4 A
• at "0" signal (residual	Max. 0.5 mA
current)	
Resistive load range	12 Ω to 4 k Ω
Lamp load	max. 10 W
Parallel connection of	
two outputs	
 for load control redundancy 	possible

6.8 I/O module 8 DI / 8 DO 1.3 A (6ES7 143-3BH00-0XA0)

Properties

The I/O module 8 DI / 8 DO 1.3 A has the following features:

- 8 digital inputs
- Input nominal voltage DC 24 V
- suitable for switches and proximity switches (BEROs)
- 8 digital outputs
- output current = 1,3 A per output
- rated load voltage = 24 VDC
- suitable for magnetic solenoid valves, DC contactors and signal lamps

Pin assignment of the DI sockets

The table below shows the pin assignment of the eight digital input and output sockets.

Pin	Assignment of socket X1	Assignment of socket X2	Assignment of socket X3	Assignment of socket X4	View of the socket (Front view)
1	24 V sensor power supply	n.c.	24 V sensor power supply	n.c.	
2	Input signal channel 1	Output signal Channel 1	Input signal channel 3	Output signal Channel 3	× 02
3	Ground sensor supply	Ground load voltage supply	Ground sensor supply	Ground load voltage supply	
4	Input signal channel 0	Output signal Channel 0	Input signal channel 2	Output signal Channel 2	
5	PE	1			
Pin	Assignment of socket X5	Assignment of socket X6	Assignment of socket X7	Assignment of socket X8	
1	24 V sensor power supply	n.c.	24 V sensor power supply	n.c.	
2	Input signal channel 5	Output signal Channel 5	Input signal channel 7	Output signal Channel 7	
3	Ground sensor supply	Ground load voltage supply	Ground sensor supply	Ground load voltage supply	
4	Input signal channel 4	Output signal Channel 4	Input signal channel 6	Output signal Channel 6	

Table 6-9Pin-out of the digital input and output sockets X1 to X8

Block Diagram



The following figure shows the block diagram of the I/O module 8 DI / 8 DO 1.3 A.

Figure 6-8 Block diagram of I/O module 8 DI / 8 DO 1.3 A

Dimensions a	und weight	Isolation test voltage	500 VDC
Dimensions	60 × 210 × 28	Current load	
$W \times H \times D$ (mm)		 on power supply 1L+ 	typically 70 mA
Weight	approx. 210 g	on load voltage supply	
Module-spe	cific data	267	typically 60 mA
Transmission rates	9.6/19.2/45.45/93.75/	Power loss of the module	typically 5 W
	1.5/3/6/12 Mbps	Status, interrupt	s, diagnostics
Bus protocol	PROFIBUS-DP	Status display	Green LED per channel
Number of channels	8 digital outputs	Interrupts	no
Cable length		Diagnostic functions	
Unshielded	max. 30m	Group error display	Red LED (SF)
Manufacturer ID	80FC _H	Channel error display	no
Voltages, curren	ts, potentials	Read access to	possible
Rated voltage of the	24 VDC	diagnostics data	
supply 1L+		Encoder power s	upply outputs
 Reverse polarity 	yes	Number of outputs	8
protection	24 VDC	Output current	up to 55 °C max. 1A (cumulative current)
Boyorso polarity	24 000	Short-circuit protection	yes, electronic
protection	yes	Encoder sele	ction data
Number of inputs that can	8	Input voltage	
be addressed		Rated value	24 VDC
		• for "1" signal	13 to 30 V
• all mounting positions		 for "0" signal 	– 3 to 5 V
Cumulative current of the		Input current	
outputs		 at signal 1 	typically 7 mA
 all mounting positions 		• at signal 0	
up to 55° C	5.2 A ¹⁾	Input delay	
Isolated potential		• "0" to "1" transition	typically 3 ms
 between channels 	no	• "1" to "0" transition	typically 3 ms
between PROFIBUS DB and other circuit	yes	Input characteristic curve	according to IEC 61131, Type 1
components		Connection of 2–wire BERO	possible
Permitted potential difference		 permitted no–load 	max. 1.5 mA
between different circuits	75 VDC, 60 VAC	 Please note the current of 	capacity of the cable

Technical Data of the I/O Module 8 DI / 8 DO 1.3 A

Actuator sele	ction data	• for power increase	No
Output voltage		Digital input control	possible
 at signal 1 	min. 2L+ (– 1.2 V)	Switching frequency	
Output current		 resistive load 	max. 100 Hz
 at signal 1 		 inductive load 	max. 0.5 Hz
Rated value	1.3 A	according to IEC	
Permitted range	5 mA to 1.8 A	947-5-1, DC13	
 at "0" signal (residual 	Max. 0.5 mA	 lamp load 	max. 1 Hz
current)		Limiting (internal) of	typically 2L+ (- 44 V)
Resistive load range	12 Ω to 4 k Ω	inductive cut–off voltage	
Lamp load	max. 10 W	to	
Parallel connection of		Short–circuit protection of outputs	Yes, electronic
two outputs		 response threshold 	typically 4 A per
 for load control redundancy 	possible		channel

A

Order numbers

Introduction

Find below the order numbers of all components you may require for operating the ET 200eco.

ET 200eco components

Description	Order no.
I/O module 8 DI	6ES7 141-3BF00-0XA0
I/O module 16 DI	6ES7 141-3BH00-0XA0
I/O module 8 DO 2 A	6ES7 142-3BF00-0XA0
I/O module 16 DO 0.5 A	6ES7 142-3BH00-0XA0
I/O module 8 DI / 8 DO 2.0A	6ES7 143-3BH00-0XA0
I/O module 8 DI / 8 DO 1.3 A	6ES7 143-3BH10-0XA0
Terminal block M12, 7/8"	6ES7 194-3AA00-0BA0
Terminal block ECOFAST	6ES7 194-3AA00-0AA0

Table A-1 ET 200eco components – Order numbers

ET 200eco accessories

Table A-2 ET 200eco accessories – Order numbers

Description	Order no.
Labels 20 mm x 7 mm	3RT1 9001 SB20

I/O module accessories

Description	Order no.
M12 caps	3RX9 802-0AA00
Y connector M12, 5–pin (for dual connection of actuators and sensors to digital inputs/outputs.	6ES7 194-1KA01-0XA0
Angled coupler plug M12, 5–pin (for connecting actuators or sensors; not for use with Y connector M12)	on request
User–specific configuration of the sensor/actuator cable: • Coupler plug M12	
	on request

Table A-3 I/O module accessories – Order numbers

Accessories for the ECOFAST Terminal block

Description	Order no.
Configuration plug (1 piece) for setting the PROFIBUS address (replacement part)	6ES7 194-1KB00-0XA0
ECOFAST hybrid prefabricated cable (2 and 2x2 copper conductors, \varnothing 1.5 mm ²) of various lengths, with ECOFAST connector:	
1.5 m	6XV1 830-7BH15
3.0 m	6XV1 830-7BH30
5.0 m	6XV1 830-7BH50
10.0 m	6XV1 830-7BN10
15.0 m	6XV1 830-7BN15
20.0 m	6XV1 830-7BN20
25.0 m	6XV1 830-7BN25
30.0 m	6XV1 830-7BN30
35.0 m	6XV1 830-7BN35
40.0 m	6XV1 830-7BN40
45.0 m	6XV1 830-7BN45
50.0 m	6XV1 830-7BN50
ECOFAST terminating resisitor for PROFIBUS DP	
1 unit	6GK1 905-0DA10
5 units	6GK1 905-0DA00
For user-specific configuration of the hybrid cable:	
 PROFIBUS ECOFAST Hybrid Plug 180 (ECOFAST Cu, 5-piece package) 	
Pin insert (for loop-through)	6GK1 905-0CA00
Socket insert (for power supply)	6GK1 905-0CB00

Table A-4 Accessories for the ECOFAST terminal block – Order numbers

Description	Order no.
 ECOFAST hybrid cable sections (2 and 2x2 copper conductors) of various lengths: 	
20 m	6XV1 830-7AN20
50 m	6XV1 830-7AN50
100 m	6XV1 830-7AT10
 ECOFAST hybrid cable by meter lengths (2 and 2x2 copper conductors) 	6XV1 830-7AH10

Table A-4	Accessories for the ECOFAST	terminal block - Or	der numbers, continued
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M12, 7/8" terminal block accessories

Table A-5	M12, 7/8'	terminal block accessories	- Order numbers
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Description	Order no.
2–wire PROFIBUS prefabricated cable (inverse encoding) of various lengths, with M12 connector:	
1.5 m	6XV1 830-3DH15
3.0 m	6XV1 830-3DH30
5.0 m	6XV1 830-3DH50
10.0 m	6XV1 830-3DN10
15.0 m	6XV1 830-3DN15
M12 terminating resistors for PROFIBUS DP (5–piece package)	6GK1 905-0EC00
5x1.5 mm ² power supply prefabricated cables in various lengths with 7/8" connectors:	
1.5 m	6XV1 822-5BH15
3.0 m	6XV1 822-5BH30
5.0 m	6XV1 822-5BH50
10.0 m	6XV1 822-5BN10
15.0 m	6XV1 822-5BN15
7/8" caps (10-piece package)	6ES7194-3JA00-0AA0
For user-specific configuration of the PROFIBUS cable:	
PROFIBUS FC standard cable	6XV1 830-0EH10
PROFIBUS FC robust cable	6XV1 830-0JH10
PROFIBUS FC food cable	6XV1 830-0GH10
 PROFIBUS FC trailing cable 	6XV1 830-3EH10
(respective minimum length: 20 m)	
 M12 connectors (5–piece package) 	
 pin insert for field configuration 	6GK1 905-0EA00
 socket insert for field configuration 	6GK1 905-0EB00
For user-specific configuration of the power supply cable:	
 7/8" connectors (5–piece package) 	
 pin insert for field configuration 	6GK1 905-0FA00
 socket insert for field configuration 	6GK1 905-0FB00

ET 200 under SIMATIC S5 manual

To program and commission ET 200eco under *STEP 7* with *COM PROFIBUS*, you require the following manual.

Table A-6 STEP 7 and SIMATIC S7 Manual

Description	Content
ET 200 distributed I/O system	Includes
	 Description of the master interface module IM 308-C for S5-115U/H, S5-135U and S5-155U/H
	 Description of the S5-95U with PROFIBUS–DP master interface
	 Description of the installation of a DP and FMS system with a CP 5412 (A2) as master
	Handling of COM PROFIBUS
	Working with FB IM 308C/FB 230

PROFIBUS DP under SIMATIC S7 and STEP 7 manual

Table A-7	PROFIBUS DP	and SIMATIC	S7 Manual
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Documentation	Order numbers	Content
Distribution with PROFIBUS DP – Installation, configuration and use of PROFIBUS DP under SIMATIC S7 – Josef Weigmann, Gerhard Kilian Publicis MCD Verlag, 2nd edition, 2000	In bookstores: ISBN 3-89578-123-1 At your local SIEMENS branch location: A19100-L531-B772	Manual containing an easy introduction to PROFIBUS DP and implementation of automation tasks with PROFIBUS-DP and SIMATIC S7. Based on SIMATIC S7, the manual also provides many practical sample applications of PROFIBUS DP.
B

Dimensional drawings

Introduction

Find below the dimensional drawings of the major components for ET 200eco.

I/O module with installed M12, 7/8" terminal block



Figure B-1 Dimensional drawing of an I/O module with installed M12, 7/8" terminal block



I/O module with installed ECOFAST terminal block

Figure B-2 Dimensional drawing of an I/O module with installed ECOFAST terminal block

С

I/O address area

I/O module 8 DI

Assignment of the module inputs in the process image:



Figure C-1 Address area of I/O module 8 DI

I/O module 16 DI

Assignment of the module inputs in the process image:



Figure C-2 Address space of I/O module 16 DI

I/O module 8 DO 2 A

Assignment of module outputs in the process image table:



Figure C-3 Address area of I/O module 8 DO 2 A

I/O module 16 DO 0.5 A

Assignment of module outputs in the process image table:



Figure C-4 Address area of I/O module 16 DO 0.5 A

I/O module 8 DI / 8 DO 2 A

Assignment of module inputs/outputs in the process image table:



Figure C-5 Address area of I/O module 8 DI / 8 DO 2 A

I/O module 8 DI / 8 DO 1.3 A

Assignment of module inputs/outputs in the process image table:



Figure C-6 Address area of I/O module 8 DI / 8 DO 1.3 A

Glossary

Automation system

An AS is a PLC (Programmable Logic Controller) which consists of at least one CPU and various I/O modules, plus operator control and monitoring devices.

Chassis ground

The term refers to the equipotential bonding of all equipment parts that may not carry a hazardous touch voltage in the event of faults.

Configuration

Refers to the arrangement of individual modules in a distributed I/O system.

Diagnostics

Refers to the detection, localization, classification, display and further evaluation of errors, disturbances and messages.

Diagnostics provides monitoring functions that run automatically when the plant is in operation. This increases plant availability by reducing commissioning and down times.

Distributed I/O devices

Distributed I/O units are not installed in the PLC rack, but are rather distributed to remote locations, e.g.:

- ET 200M, ET 200S, ET 200X, ET 200L, ET 200eco
- DP/AS-I Link
- S5-95U with PROFIBUS DP slave interface
- other DP slaves made by SIEMENS or third parties

Distributed I/Os are interconnected to the DP master via PROFIBUS DP.

DP Address

 \rightarrow PROFIBUS address

DP master

A \rightarrow master that operates in accordance with IEC 61784-1:2002 Ed1 CP 3/1 is referred to as a DP master.

DP-Norm

The DP standard is the bus protocol of the ET 200S distributed I/O system in accordance with IEC 61784-1:2002 Ed1 CP 3/1.

DP slave

 $A \rightarrow$ slave that operates on PROFIBUS with the PROFIBUS-DP protocol and functions in accordance with IEC 61784-1:2002 Ed1 CP 3/1 is called a DP slave.

ET 200eco

Distributed I/O station for modular for I/O installation.

ECOFAST

Energy and **Co**mmunication Field Installation System) Refers to a system for distributed and modular installation as well as comprehensive diagnostics on component level.

Equipotential bonding

Refers to an electrical connection (equipotential bonding conductor) that keeps electrical equipment and extraneous conductive objects to the same or almost the same potential in order to prevent disturbing or hazardous voltages between these objects.

Error handling

 \rightarrow Diagnostics

Floating

The reference potential for the control and load circuits of floating–potential I/O modules is galvanically isolated; e.g. via optocoupler, relay or transformer. I/O circuits can be connected to the same source potential.

Ground

Refers to conductive ground, with arbitrary zero point of the electrical potential. In the vicinity of grounding elements, the ground may have a potential other than zero. For this reason, the term "reference ground" is often used.

Grounding

The term refers to the grounding of electrically conductive components a metallic conductor.

I/O module

Sensors and actuators are connected to the I/O module via coupler plug or Y connector.

Master

who are in possession of the token may send data to other nodes and also request data from other nodes (= active node). DP masters are the CPU 315-2 DP or IM 308-C, for example.

Node

Refers to a device that can send, receive and amplify data via the bus, e.g. DP master, DP slave, RS485 repeater.

Node address

 \rightarrow PROFIBUS address

Non-floating

Refers to the electrical interconnection of the reference potential in the control and load circuit of I/O modules.

PE sheath

Cable with polyethylene (PE) sheath (protective sheath).

PROFIBUS

PROcess Fleld BUS, the German process and field bus standard specified in IEC 61784-1:2002 Ed1 CP 3/1. This specifies the functional, electrical and mechanical characteristics of a bit-serial fieldbus system.

Available PROFIBUS protocols are: DP (= Distributed Peripherals), FMS (= Fieldbus Message Specification), PA (= Process Automation) or TF (= Technological Functions).

PROFIBUS address

All bus nodes must be assigned a unique PROFIBUS address for their identification on the PROFIBUS network. Available PROFIBUS addresses for ET 200eco: 1 to 99.

PUR sheath

Cable with polyurethane (PUR) sheath (protective sheath).

Reference potential

Arbitrary electrical point of reference (zero potential) for the measurement and/or monitoring of voltages in circuits referenced to this potential.

Slave

A slave may only exchange data with a \rightarrow master on request. Slaves are, for example, all DP slaves such as ET 200S, ET 200X, ET 200M, ET 200eco etc.

Station ID

 \rightarrow PROFIBUS address

T functionality

This functionality is integrated in all terminal blocks by default. Refers to the through–loop of PROFIBUS DP and of the power bus to the next PROFIBUS node. Result: When you disconnect the terminal block during runtime, the downstream PROFIBUS nodes can continue operation.

Terminal block

Plug–in module for quick change of the terminal configuration. Available versions: ECOFAST and M12 / 7/8".

Voltage designations for ECOFAST

Alternative voltage designations for ECOFAST:

- Electronic/sensor power supply (1L+) = load voltage, not switched (NS)
- Load voltage supply (2L+) = load voltage, switched (S)

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